Remarks / Arguments

Prior Art Cited by the Examiner

In the Office Action, the Examiner made reference to 2 documents:

Document	Date	Inventor
US-5,783,824	07-1988	Baba et al.
US-5,696,376	12-1997	Doroshenko et al.

Summary of Interview

The Examiner granted an interview on September 15, 2005. The Applicant is grateful for the opportunity to review the application and the Office Action with the Examiner. The interview was quite productive and will hopefully lead to a rapid conclusion in this matter.

Present at the interview were:

- Examiner Phillip Johnston
- Dr. James Hager, the Applicant
- Nazima Kamalia, representative of MDS Inc., assignee of this application
- Bhupinder Randhawa, agent for the Applicant

Topics discussed: The invention of claim 1 was discussed in relation to Baba. Doroshenko was briefly discussed. The substance of the submissions made by the Applicant in the interview are set out in the remarks below, and are not repeated here.

Agreements reached: The Examiner and the Applicant agreed that claim 1 would be amended to more clearly indicate the relationship of the first and second charge states to the magnitude of the energy barrier.

Amendments to the Claims

Claim 1 has been amended to more thoroughly describe the first and second effective barrier heights.

Claim 1 relates to a method of analyzing ions to enhance separation of groups of ions with different charge states.

The magnitude of the energy barrier in part (4) of claim 1 is defined as the barrier magnitude.

The first effective barrier height is now clearly defined as being equal to the first charge state multiplied by the barrier magnitude. Similarly, the second effective barrier height is clearly defined as being equal to the second charge state multiplied by the barrier height.

Since the first and second charge states are unequal, the first and second barrier heights will be different during the separation time period during which the barrier magnitude is constant.

During the separation time period, ions in the first group of ions preferentially escape from the ion processing section, since the first effective barrier height is lower than the kinetic energy of the first group of ions. At the same time, the second group of ions are preferentially retained in the ion processing section, since the second effective barrier height is higher than the kinetic energy of the second group of ions.

The Examiner rejected claim 1 as previously on file as anticipated by Baba.

The Baba reference discloses a linear ion trap mass spectrometer. Referring to Figures 1 and 2 of Baba a set of arcuately concave planar electrodes 17, 18, 19 and 20 are added to a quadrupole mass spectrometry apparatus (column 13: lines 14-27 and 13:60-66). Ions are mass analyzed by applying an alternating voltage 31 to the planar electrodes. Ions whose secular frequency coincides with the frequency of the alternating voltage oscillate in the axial direction of the ion trap mass spectrometer and are eventually ejected in an axial direction. The secular frequency of an ion is dependent on its mass-to-charge ratio m/z. Baba's ion trap mass spectrometer is dependent on controlling the motion of the ions.

In contrast, the invention of amended claim 1 preferentially separates ions based on their charge states, not based on the mass-to-charge ratios. For example, the present invention may be used to separate an ion having a mass of 1000 with 2 charges from an ion having a mass of 500 with a single charge. Baba's device will see both ions as having a mass-to-charge ratio of 500 and will not be able to distinguish between them.

Furthermore, ions are free to move about in the ion processing section of the present invention. No particular motion, and specifically no axial motion, is imposed on the ions. Ions in the first group escape the ion processing section due based on their kinetic energy and charge state.

Accordingly, the Applicant respectfully submits that Baba's ion trap mass spectrometer cannot be used with the method of claim 1.

Each of the remaining claims in the application is dependent on claim 1 and is accordingly patentable over Baba for the same reasons.

Each of the remaining claims 2-4 and 6-24 is dependent on claim 1, and is accordingly patentable over Baba for the same reasons.

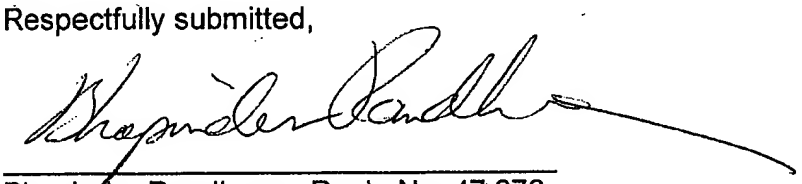
The Examiner rejected claims 13 and 18-24 as obvious over Baba in view of Doroshenko. Each of these claims is dependent on claim 1. As described above, Baba's ion trap mass spectrometer cannot be used to separate ions of different charge states. Doroshenko makes reference to various types of mass spectrometers, but does not describe the separation of ions based on their charge states. Accordingly, the Applicant submits that these claims are patentable over Baba in light of Doroshenko.

Claim 6 has been amended to be dependent on claim 4. Claim 5 (on which claim 6 was previously dependent) was cancelled in a previous amendment.

Conclusion

In view of the foregoing comments, it is respectfully submitted that the application is now in condition for allowance. If the Examiner has any further concerns regarding the language of the claims or the applicability of the prior art, the Examiner is respectfully requested to contact the undersigned at 416-957-1630.

Respectfully submitted,



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Subj: **RE: Filing New Application - our file: 38898-0108**
Date: 9/19/2005 2:28:00 P.M. Eastern Daylight Time
From: mmena@ridoutmaybee.com
To: Specialpat@aol.com
CC: FRowand@ridoutmaybee.com

Please file the enclosed application on **September 20, 2005**.

Please confirm safe receipt by return email. Thank you!

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